

STEM ACROSS THE SYSTEM



Sheila Jones
Saturday, March 28, 2015

Why STEM

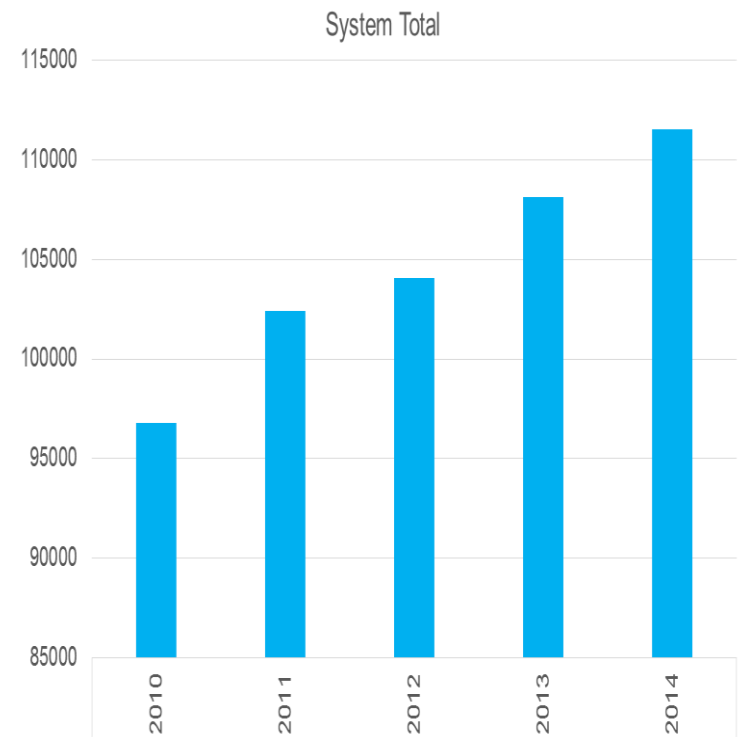
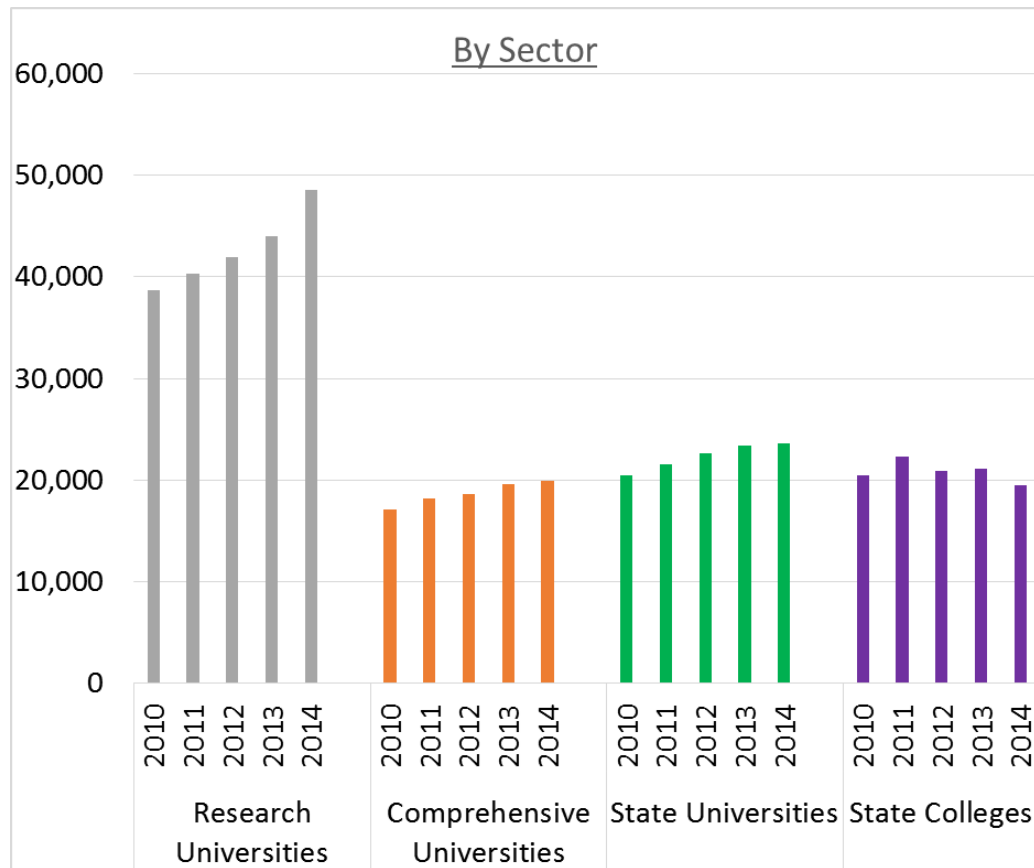
- STEM workers play a key role in the sustained growth and stability of the U.S. economy, and are a critical component to helping the U.S. win the future.
- Over the past 10 years, growth in STEM jobs was three times as fast as growth in non-STEM jobs.
- STEM workers are also less likely to experience joblessness than their non-STEM counterparts.
- STEM occupations are projected to grow by 17.0 percent from 2008 to 2018, compared to 9.8 percent growth for non-STEM occupations.
- STEM degree holders enjoy higher earnings, regardless of whether they work in STEM or non-STEM occupations.

In Georgia

- STEM completion is a strategic priority within Georgia's overall goal of expanding economic and life opportunities for our citizens
- USG data indicates the trends are heading in the right direction in STEM degree production

STEM in the USG - Enrollment

Number of Students Enrolled in STEM Degree Programs, by Fiscal Year



STEM in the USG – Success in Science

Percentage of Students that Receive A, B, C in STEM Core Courses

	Biology		Chemistry		Physics	
	<u>1111</u>	<u>1112</u>	<u>1151</u>	<u>1152</u>	<u>1111</u>	<u>1112</u>
FY 11	68.4%	83.7%	69.7%	74.6%	73.1%	86.9%
FY 12	67.4%	81.6%	69.4%	73.3%	71.6%	87.3%
FY 13	71.7%	82.5%	68.3%	75.2%	75.0%	87.9%
FY 14	70.3%	83.6%	68.6%	78.1%	74.6%	86.9%

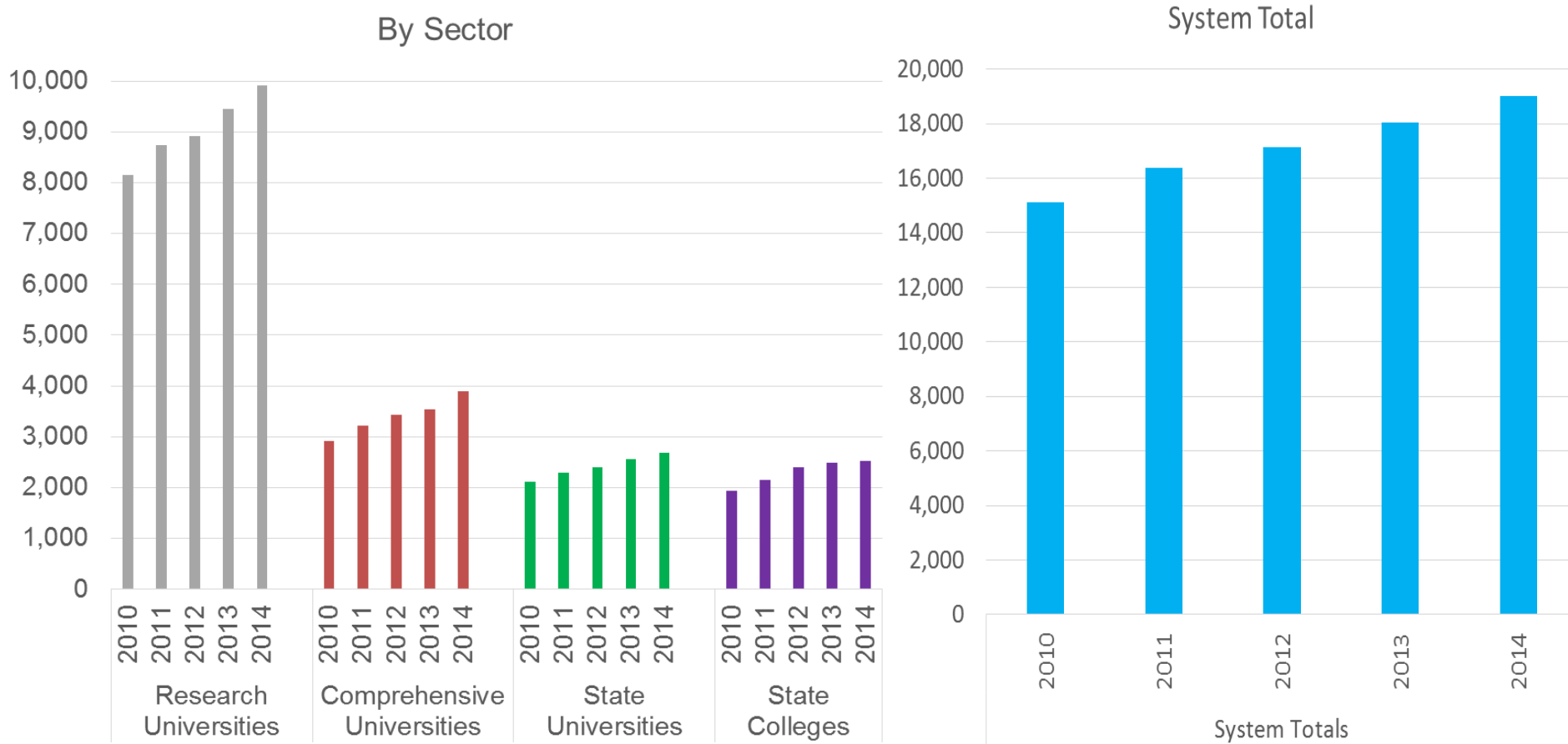
STEM in the USG – Success in Math

Percentage of Students that Receive A, B, C in STEM Core Courses

	<u>College Algebra</u> <u>(1111)</u>	<u>Pre-Calculus</u> <u>(1113)</u>	<u>Calculus I</u>	<u>Calculus II</u>
FY 11	56.8%	61.1%	63.8%	65.8%
FY 12	58.1%	63.5%	64.2%	67.5%
FY 13	59.7%	64.3%	64.8%	68.9%
FY 14	62.2%	63.5%	65.2%	68.8%

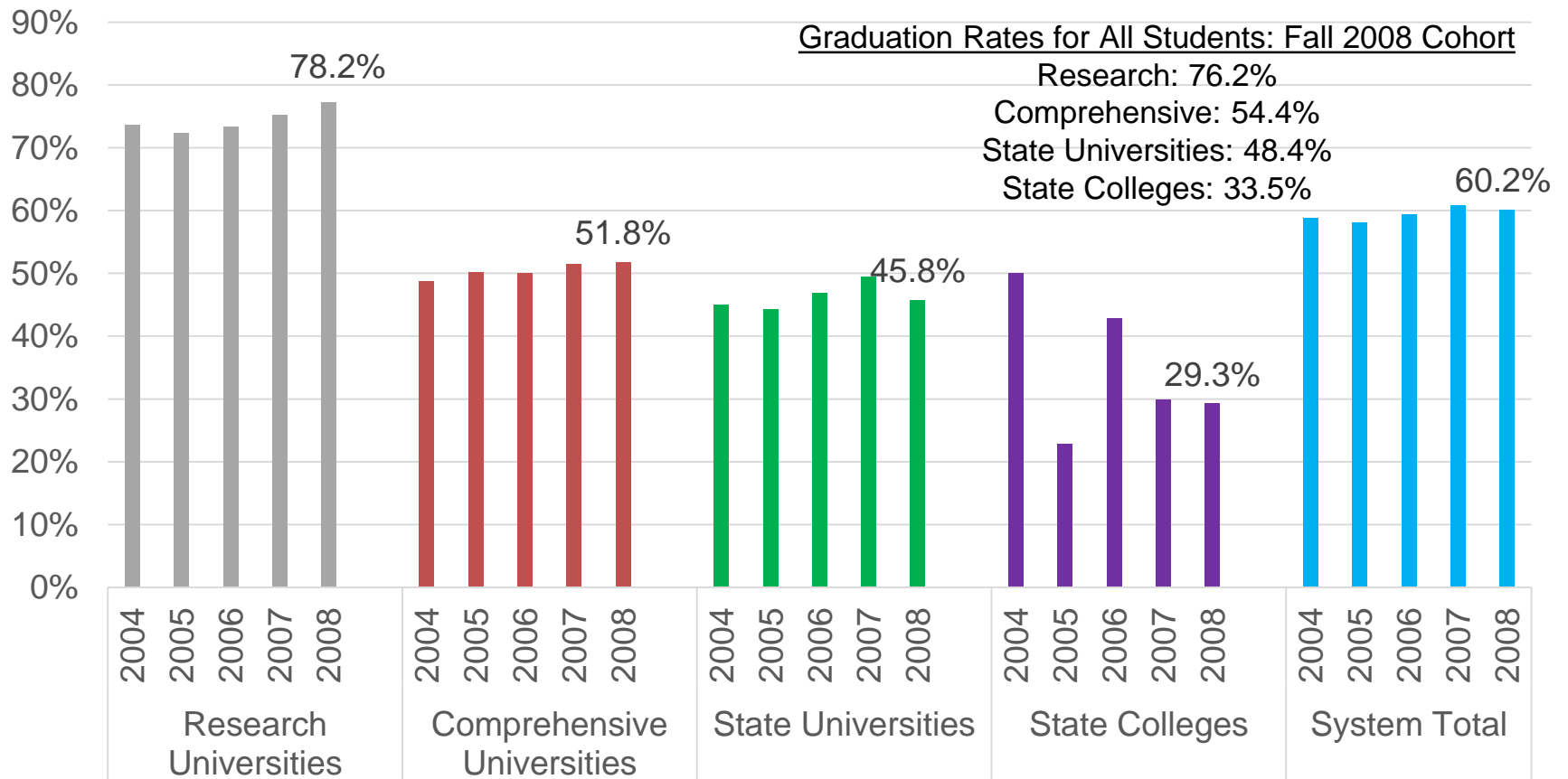
STEM in the USG - # Degrees Awarded

Number of Degrees Awarded in STEM Fields, by Fiscal Year



STEM in the USG—Graduation Rates

Six-Year System Graduation Rates for Bachelor's Degree-Seeking Students that Declared a STEM Major as Freshmen



STEM Efforts within USG

- 2007-Present: USG STEM Initiative



- 2011-present: Complete College Georgia



USG STEM Initiative Objectives

Objective #1: P-12 Readiness

To increase the number of K-12 students who prepare for and are interested in majoring in science, technology, engineering, and mathematics (STEM) in college.

Objective #2: STEM Success

To increase the success rates and number of students in college who pursue the STEM disciplines.

Objective #3: STEM Educator Preparation

To increase the number of teachers who are prepared in science and mathematics—which will lead to an increase in the number of K-12 students who are prepared to enter the STEM fields.

USG STEM Initiative Projects

- **P-12 Readiness**
 - K-12 service learning programs
 - Summer STEM camps for high school students
 - P-20 learning communities
- **STEM Success in College**
 - Faculty Mini-grant programs
 - Revision of STEM courses or programs
 - Undergraduate research included as part of degree requirements
 - Comprehensive summer bridge programs
 - Peer Led Supplemental Instruction in core courses
 - Implementation of MESA
 - P-20 Learning Communities
 - Institutes on the Scholarship of Teaching and Learning
- **STEM Educator Preparation**
 - Academy for Future Teachers (AFT)
 - Recruitment programs
 - Revision of ed prep programs

Red indicates UGA participation

Scholarship of STEM Teaching and Learning Conference

This conference complements the University System of Georgia's STEM Initiative whose goals include the following:

- Promoting K-12 student preparation for and interest in majoring in STEM fields in college
- Increasing the success of STEM majors in college
- Producing more and better STEM teachers for K-12 schools, which in turn will lead to increased preparation of students in science and mathematics

**SAVE
THE
DATE**

March 5 - 6, 2015

**Thursday • Statesboro Holiday Inn - 6 - 9 p.m.
Friday • Nessmith-Lane Conference Center - 8 a.m. - 3:30 p.m.**

Visit the website for highlights and downloads from previous conferences!

NESSMITH-LANE CONFERENCE CENTER, STATESBORO, GA

STEM
SCIENCE TECHNOLOGY ENGINEERING & MATH

**4TH ANNUAL GEORGIA
SCHOLARSHIP OF STEM
TEACHING & LEARNING
CONFERENCE**

With sponsorship from the University System of Georgia (USG) Board of Regents, Georgia Southern University will host this conference for educators, students, and industry professionals with interests in the Scholarship of STEM Teaching and Learning. Participants are invited from all USG colleges and universities, private higher education institutions within the state, industry, and local area K-12 schools.

MARCH 5 • Conference kick-off Statesboro Holiday Inn

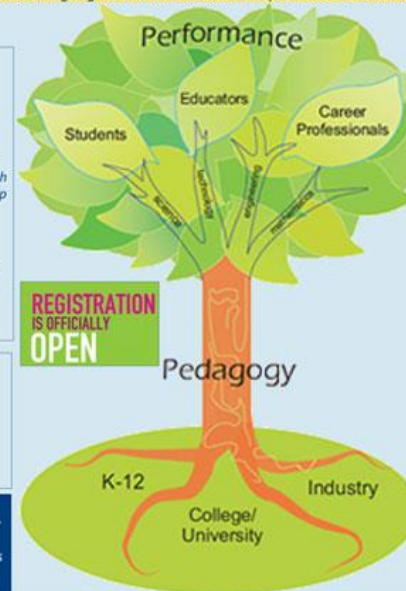
6 - 9 p.m. Registration 6 - 9 p.m.
7 - 9 p.m. Poster Session & Social

MARCH 6 • Main Conference

8 a.m. - 3:30 p.m. Nessmith-Lane Conference Center

This conference is **FREE** for the first 200 participant who register and attend. However, each participant must pay a \$25 administrative fee upon registration. This amount will be refunded to the first 200 participant who register and attend the conference.
EXAMPLE: Your conference fee (\$25-\$25 = \$0) for the first 200 or \$25 for all others) includes registration and all meals.

Attendees are responsible for covering the cost of their hotel accommodations, incidentals and travel expenses. Conference meals will be provided. However, there will be some "conference travel scholarships" available. Please contact Joy Darley for details.



stem.georgiasouthern.edu/



Funded by
Board of Regents of
the University System
of Georgia

CONFERENCE ORGANIZER
Dr. Joy Darley, jdarley@georgiasouthern.edu



STEM Initiative Institutions

- Armstrong State University (2007-2011)
- Atlanta Metropolitan State College (2007-2011)
- Columbus State University (2007- present)
- Darton State College (2007-2011)
- Georgia College (2007- present)
- Georgia Gwinnett College (2011- present)
- Georgia Perimeter College (2007- present)
- Georgia Southern University (2011-present)
- Georgia Southwestern State University (2007-2011)
- Georgia State University (2007- present)
- South Georgia College (2007-2011)
- Southern Polytechnic State University (2007-2011)
- The University of Georgia (2007- present)
- The University of West Georgia (2011-present)

Accomplishments 2007-2011

- Increase in ABC rates in introductory STEM courses: Biology – 1.4%, Chemistry- 3.0%, Mathematics – 1.1%, and Physics- 1.5%
- Decrease in W and WF rates in introductory STEM courses: Biology – 1.2%, Chemistry – 4.1%, Mathematics – 0.8%, and Physics – 7.9%
- Increase in STEM majors: *Minimum* of 7.84%
- STEM education degrees conferred **increased** by 37.67% from 215 to 296 (at the 6 institutions with STEM Ed Prep)
- Number of STEM degrees *increased* by **19.30%** among the 11 participant institutions between FY2007 and FY2011. After considering all degrees conferred, the proportion of STEM degrees, relative to other degrees, *increased* by **1.71%** in the same period

Accomplishments 2011 – Present

- The proportion of students enrolled in STEM degree programs versus all programs **increased** by a range of 1.1% to 5.01% across participating institutions
- STEM degrees awarded **increased** by a range of 4.1% to 39.4% across participating institutions
- All participating institutions developed and deployed mini-grant programs designed for faculty to implement novel methods of instruction to improve STEM achievement

CCG Goals

- **Goal 1:** Increase in the number of undergraduate degrees awarded by USG institutions. (Overall, in priority communities, and in STEM fields).
- **Goal 2:** Increase the number of degrees that are earned “on time,” shortening the time to degree (Associate’s Degrees in 2 years, Bachelor’s Degrees in 4 years).
- **Goal 3:** Decrease excess credits earned on the path to getting a degree. In tandem with Goal 2, this should result in more students graduating on time and without wasted credits.
- **Goal 4:** Provide targeted advising to keep students on track to graduate. Proactive advising helps advisors reach out to students in a timely manner, before problems become overwhelming.

CCG Goals

- **Goal 5:** Award degrees to students who may have already met for associate's degrees via courses taken at one or more institutions.
- **Goal 6:** Shorten time to degree completion through programs that allow students to earn college credit while still in high school and by awarding credit for prior learning that is verified by appropriate assessment.
- **Goal 7:** Increase the likelihood of degree completion by transforming the way that remediation is accomplished.
- **Goal 8:** Restructure instructional to support educational excellence and student success.
- **Goal 9:** Improve access for underserved and/or priority communities.

STEM and the CCG Campus Plans

STEM is a feature of Goal 1: Increase in the number of undergraduate degrees awarded by USG institutions.

- For 2014, six institutions identified their work on STEM in their campus plan updates.
- Two overarching themes emerge:
 - Recruitment & intake engagement
 - Supplemental support (esp. early in program)

2014 CCG STEM Efforts

- **Abraham Baldwin Agricultural College:**
 - Added a B.S. in Biology
 - 10 Scholarships annually
 - Regents Engineering Transfer Program
 - Block Schedules
- **Columbus State University**
 - High School STEM Honors camp
 - Tutoring in STEM courses with peer instruction leaders
 - Scholarships for STEM teacher candidates
- **Georgia Gwinnett College**
 - Redesigning STEM courses
 - Including more authentic research experiences
 - K-12 service learning opportunities

2014 CCG STEM Efforts

- Georgia Institute of Technology
 - Recruitment of women and underrepresented minorities
 - Partnerships across the state to recruit teachers
- Georgia Perimeter College
 - Full-time STEM coordinator to support its activities and grants
 - Student led supplemental instruction
 - Summer research opportunities in STEM
- Kennesaw State University
 - The combined KSU and SPSU have expressed commitment to STEM
 - Long history of partnerships with K-12 to increase interest and recruitment for STEM
 - Educator preparation focused on STEM

Other CCG Activities of Note

- **University of West Georgia: STEM to STEAM**
 - High number of STEM interested freshmen entering underprepared for English 1101/1102
 - Piloting a STEAM-based approach, developed collaboratively between Humanities and Science faculties
 - STEAM sections are taken as a cohort
- **University of Georgia: Open Resources**
 - High cost of STEM textbooks
 - UGA's Center for Teaching and Learning worked with faculty to develop a course around an OER for a high volume Biology course, providing a major cost savings for hundreds of students

Continuing STEM Challenges

- Ensuring K-12 readiness for college-level STEM coursework, particularly mathematics
- The role of STEM in postsecondary attainment
- Student retention in STEM degree programs
- Building an evidence base to support promising practices in STEM instruction and support
- Expanding promising practices developed at STEM Initiative institutions to **ALL** USG institutions

Final Thoughts

Areas of Achievement

- Enrollment in STEM has been increased
- Passing rates in STEM Core courses have improved
- Bachelor's Degree Graduation Rates have increased
- STEM Degrees Awarded have increased

Areas for Improvement

- Recruiting students into STEM fields that are needed for Georgia's economy
- Retaining students into STEM fields



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http://www.usg.edu/educational_access/stem